

1. (Currently Amended) A method for etching a pattern on a workpiece, comprising:

selecting a workpiece with a hard mask deposited over a layer to be etched, which hard mask is comprised of a reactive metal, the hard mask further defining a pattern exposing portions of the layer to be etched including at least one portion having a critical dimension, said hard mask being substantially unoxidized; and

processing the workpiece in the reactor by exposing the workpiece to oxidizing gas prior to exposure to mixed with an etchant in order to expose the hard mask to the oxidizing gas and form an oxide skin on the exposed surface of the hard mask, and in order to subsequently etch the layer corresponding to the pattern of the hard mask, whereby growth of the layer during the etch is minimized in the portion of the layer corresponding to the critical dimension.

2-41. (Cancelled)

42. (Previously Presented) The method of claim 1, wherein:

said selecting step includes selecting a workpiece having a hard mask, which hard mask comprises of one of titanium, aluminum, and tantalum.

43-44. (Cancelled)

45. (Previously Presented) The method of claim 1, wherein:

the oxidizing gas comprises one of oxygen, nitrogen, fluorine, boron, and carbon gas, and any combination of oxygen, nitrogen, fluorine, boron, and carbon gas, in the reactor prior to or during said etch step.

46. (Previously Presented) The method of claim 1, wherein :

said selecting step includes selecting a workpiece with a lithographic layer covering the hard mask.

47. (Previously Presented) The method of claim 1, wherein:

said selecting step includes selecting a substrate having a hard mask which is readily oxidizable.

48. (Previously Presented) The method of claim 1, wherein:

said selecting step includes selecting a substrate with a hard mask, which hard mask is comprised of a metal with a low sputtering yield.

49. (Previously Presented) The method of claim 1, wherein:

oxidizing the hard mask oxidizes the surface of the hard mask, thereby slowing down an etch rate of the hard mask.

50. (Previously Presented) The method of claim 1, wherein:

said selecting step includes selecting a hard mask (1) on which has been or (2) on which can be developed at least one of an oxide, nitride, fluoride, boride and carbide.

51-52. (Cancelled)

53. (Currently Amended) A method for etching a pattern on a workpiece, comprising:

processing a workpiece using etch process gases, the workpiece having a hard mask material deposited over a layer to be etched, which the hard mask material is comprised of a reactive metal and defines a pattern wherein a portion of the layer is exposed, and wherein the hard mask material is exposed to a hardening ~~remains substantially unexposed to a~~ gas for lowering at least one of its sputtering yield or erosion rate to form a hard mask prior to exposure to an etchant; and

allowing the patterned hard mask to react with the etch process ~~gas~~ gases mixed together with a hardening gas to form a hard mask in order to further lower at least one of the sputtering yield and erosion rate of the hard mask and to etch the layer corresponding to the pattern of the hard mask.

54-56. (Cancelled)

57. (Currently Amended) The method of claim 53, wherein the hardening gas ~~etch process~~ comprises a gas for lowering the erosion rate of the hard mask comprising one of oxygen, nitrogen, fluorine, boron, and carbon gas.